



Is Vertically Integrated Contract Poultry Farming System Pave the way of Small scale Poultry Farmer in Bangladesh?

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Abstract

The paper examines the potentiality of vertically integrated poultry contract farming (VICF) system on small farm's income in Bangladesh. Small poultry farm always plays a central role in economic development in the developing countries like Bangladesh but the main constraints of small farms are access to production resources and markets. Small farmers often lack the necessary production and marketing information. They may lack the availability of external credit because of bureaucratic complexity and the public policies and extension service taken to promote commercial poultry production have had more impact on large farmers than small. Like other developing countries Bangladesh agriculture is also overwhelmingly characterized by the operation of small farms. So, it would be useful to investigate the institutional mechanisms which facilitate small poultry farmer's access to credit, technical assistance, necessary inputs and reduce the production and marketing risk. To the degree that such institutional mechanisms are developed, small farmer will be able to raise their income by taking poultry as a main or subsidiary occupation. VICF is one institutional solution which with effective management could be a means to bring the transfers of technical know-how along with develop markets to enhance small farmer's income. Primary data were collected from 20 sample farmers of contract, twenty (20) independent poultry farms and 20 non-poultry farms (those who have other farming activities with same endowment) were selected from same area of Bangladesh to compare the farm income. Results indicate that by entering VICF system small contract poultry farmers have earn higher income than others which can assist them to shift their poultry farming from subsistence to semi-commercial resulting to poultry sector development in Bangladesh. This system could be an example to developing countries for poultry sector development. (*RASPA*, 7 (S) : 77-84).

Key – Words: Vertically integrated poultry contract farming (VICF) - Bangladesh.

Résumé

Le système d'intégration verticale contractuelle en aviculture montre-t-il la voie à l'aviculture familiale au Bangladesh?

Cette étude a pour but d'examiner l'impact du système d'intégration verticale contractuelle en aviculture (VICF) sur les revenus des petites unités (familiales) avicoles au Bangladesh. La (petite) ferme avicole familiale à toujours un rôle primordial dans le développement économique des pays en développement tel que le Bangladesh mais les contraintes principales des petites unités (familiales) sont l'accès aux ressources de production et aux marchés. L'information sur la production et le marché fait souvent défaut aux petits éleveurs. Ils peuvent souffrir du manque de source de crédit externe en raison de la complexité (lourdeur) bureaucratique et des politiques (mises en place) et du fait que les programmes de vulgarisation de l'aviculture ont eu plus d'impact sur les grands éleveurs (commerciaux) que les petits (éleveurs familiaux). Comme dans d'autres pays en développement l'agriculture du Bangladesh est également fortement caractérisée par la présence de petites fermes. Ainsi, il serait utile d'étudier les mécanismes institutionnels qui facilitent l'accès de l'aviculteur familial au crédit, à l'assistance technique, aux intrants nécessaires et réduire les risques pour la production et la commercialisation. Au point où si de tels mécanismes institutionnels sont mis en place, l'éleveur familial pourra augmenter son revenu en optant pour la volaille comme principale activité ou auxiliaire. Le VICF est une solution institutionnelle qui accompagné d'une gestion efficace pourrait constituer un moyen de transfert de technologie (compétence) associé au développement des marchés afin d'augmenter le revenu de l'aviculteur familial. Des données primaires ont été collectées à partir d'un échantillon de 20 éleveurs sous contrat, vingt (20) fermes avicoles indépendantes et 20 fermes de non-avicole (ceux qui ont d'autres activités agricoles avec la même dotation financière) ont été choisies dans la même région du Bangladesh pour comparer le revenu des exploitations agricoles. Les résultats indiquent qu'en entrant dans le VICF les petits éleveurs en production contractuelle obtiennent un revenu plus élevé que les autres, ce qui peut les aider à passer de aviculture de subsistance à l'aviculture semi-commercial entraînant le développement du secteur avicole au Bangladesh. Ce système pourrait être un exemple modèle pour les pays sous-développés dans le développement du secteur avicole.

Mots – Clés : Intégration verticale contractuelle en aviculture - Bangladesh.

Introduction

Bangladesh is one of the world's poorest countries. Its population of 130 million is growing at 1.6% annually, but 36% of the people remain below the poverty line (BBS 2005). The agricultural production system is crop oriented. Of the total agricultural production, crops account for about 75.0 percent, livestock 15.0 percent and forestry 10.0 percent. Livestock plays a secondary, but crucial role in the economy. Livestock farming is a

very insignificant component of the present farming system. Most of the livestock animals are being kept by the farm households in small numbers. The output of livestock products has grown, but not faster than population. In this circumstance, poultry has a good potential to increase livestock growth as well as small farmer's income since poultry has a shorter life cycle and its production requires relatively less capital and land

compared to other meat-producing animals such as cattle, sheep and goats. Moreover, poultry meat has a great demand as compared to other meat, simply because of the limitation and religious taboos in case of pork and beef.

In Bangladesh, where the population is predominately rural, agricultural incomes are important to the increasing employment as well as GDP growth. Some studies ([1],[2],[9],[13],[14]) reported that about 50% of the overall population cannot afford an adequate diet. The meager per capita income of the people living under poverty line can not meet their basic needs. Poor calorie intake as well as low intake of protein has been taken as the major contributory factor in malnutrition. Therefore, one has to look for alternatives to get regular income and employment.

The link between commercial poultry farming and changes in incomes is strong in the rural areas in Bangladesh. Since the rural population is dependent on rice production, agricultural development through commercial poultry farming is an effective approach to increase rural incomes. Like other developing countries, Bangladesh has also a long historical record of poultry raising under traditional backyard farming. Commercial poultry started in 1980 and the government simultaneously took poultry development policy in 1990 to increase commercial poultry production which resulted in a spectacular increase in the number of poultry farms. Small poultry farm always plays a central role in economic development. But the potential of increasing income and employment of small farms is quite limited. The main constraints of small farms are access to production resources (inputs, services and information) and access to markets. Firstly, small farmers often lack the production and marketing information necessary. Secondly, small farmers may lack the sufficient savings and the availability of external credit is limited because of bureaucratic complexity. Third small farmers operating near subsistence are more risk averse than large farmers. Poultry is a risky business, so farmers always tend to assure themselves to stay at break even point before expanding poultry farming. And fourth, public intervention (such as public extension service and policies) to promote commercial poultry production have had more impact on large farmers than small. Thus, from above reasons it is clear that small farmers have been left out of the main stream of the development process.

Contract farming system could play a significant role for the rapid growth of poultry industry. Contract may serve to lower transaction cost associated with searching and lowering income risk of farmers. In addition, contracting may raise farm profit by improving the quality of managerial inputs by speeding the transfer of

technological information to growers or by facilitating grower's access to credit, thereby permitting the adoption of advanced technology. It is possible to decrease poultry production cost by increasing the production capacity of feed mill and hatchery by vertically integrated contract farming system. Well organized contract farming does, however, provide necessary backward and forward linkages, and would appear to offer an important way in which poultry producer can run farm activities smoothly. So the potentiality of VICF is explored here through income and employment generation. If production of poultry is capable of generating higher net returns and higher level of labor employment, then it would be considered a potential approach for the development of rural economy.

Vertically Integrated contract farming has been introduced in Bangladesh by a big company, named ABFL (Aftab Bahumukhi (multipurpose) Farm Limited). Contract farming in developing countries has experienced a mixed fortune, yielding some successes and some failures regarding the potential of this vertically integrated contract farming system as a "bridge" for trading between integrated firms and small farmers. A good number of researches have been completed on commercial poultry production [3], [6], [8], [10], [11], [16], [17], [18] but analytical and theoretical aspects of contract farming system are not plentiful. So far, only two studies CHAWDHURY [7], KARIM [12] have dealt on benefit-cost analysis of poultry contract farming system. But this study has not carried out the potentiality of vertically integrated poultry contract farming system on small farm's income in Bangladesh.

The objective of the paper is to evaluate whether contracting system can generate small farmer's income and employment or not. The paper evaluates the profitability of small poultry farms, because if it is profitable then farmers would be encouraged to raise more poultry which may help to fulfill their family needs by providing higher income and employment opportunities. The paper also compares among the income of small farms, non-poultry farms and independent poultry farms.

Methodology of the Farm Survey

Data were collected from both primary and secondary sources. Primary data for vertically integrated contract farming were collected from Bajitpur Thana that is located in Kishorganj district. To examine the potentiality of vertically integrated contract farm on poverty alleviation 20 contract poultry farms were selected randomly by the help of AFTAB official.

Also to compare small farm income, 20 non poultry farm and 20 independent farms were selected randomly in 2006. All types of farms were selected from Bajitpur in order to neutralize location effect.

A contract farmer is defined as one who has contractual agreement with an integrator or a feed mill or a trader for supply or purchase of inputs and/or for supply or sale of outputs at pre-determined prices or at prices negotiated at the time of final transaction. Independent commercial poultry farm might be defined as where farmer or farm owner has to bear all of farm expanses at his own cost. Non-poultry farms are those farms that are not engaged in commercial poultry farming though they may raise a few scavenging poultry for home consumption and for sale if there is a surplus.

Analysis was performed to assess the impact of contracting on income and employment generation of small farmers. To determine the comparative net return gain from contract broiler farming system and independent farming system, both per farm and per bird basis comparative study have done. In this study, cost items consisted of feed, hired labor, vaccine and medicine, transportation, litter, equipment and machinery, housing, land use cost, interest on operating capital and miscellaneous. On the revenue side, return from bird, fesces and return from feed bag were considered. Gross return, net return, rate of return were determined and analyzed in this paper.

Vertically Integrated Contract Poultry Farming System

Contract farming system in broiler production was started before 1960 in most of the developed countries but in Bangladesh it was started in 1994 through ABFL as an experimental extension program whereby they first selected only 20 farmers. The agreement between ABFL¹ and a broiler contract farmer is straightforward. Farmers located in the company's operating area are eligible to enter into a contractual agreement. During the period of 1994-2003, as per the agreement, a farmer builds a covered shed at his/her own cost under the direct supervision of the ABFL extension staff ensuring congenial and healthy environment for proper growth of the birds. Then, the ABFL provides day-old-chicks, feeds, and veterinary supplies on credit as kind. They ensure purchasing of the output as well. The average duration of the grow-out cycle is roughly 5 to 7 weeks for an average sized (1.5 kg) broiler. Price of broiler was fixed at the time of contract agreement. In 2002, contract farmer received 54 Tk² /kg broiler, where as the market price was 56-70 Tk/kg. So, farmers were not much moved out by market prices as the price was pre-fixed upon at the contract agreement. All the credit liability of the contract farmer was adjusted against the value of their products. ABFL used to buy the mature broiler from the contract farmer by paying a fixed price per kg of live broiler until 2003 and then the broiler was marketed through ABFL sales centers in Dhaka.

After the bird flu rumour in 2003 which resulted from the incidences of Southeast Asia, ABFL changed the arrangement from input supply on credit to cash. During the time of bird flu incidence in Southeast Asia in 2003, there was no bird flu in Bangladesh, but the producers and consumers were suspicious about bird flu incidence

which affected the poultry industry. Price of broiler and day old chick decreased drastically within couple of days. Many farmers went out from farming as they incurred unsustainable losses. ABFL reportedly incurred loss of nearly Tk.150 million³ due to the incident. Then ABFL changed its contractual arrangement and stipulated that farmers would be paid a price of 7 Tk. per kilogram less than the prevailing market price. For example, in 2004, farmers were paid Tk 53 per kg when market price was Tk. 60 per kg live weight.

Poultry being a risk enterprise, ABFL initially tried to reduce price risk through a forward contract and purchase arrangement. Later the mechanism they developed towards a risk sharing arrangement between ABFL and the contract farmer. In order to reduce production risk, an insurance scheme linking compensation based on mortality rate was introduced. ABFL is the only organization in Bangladesh that has introduced an internal insurance scheme to cover the risk of loss and safeguard the interest of its contract farmers in case of death of immature chicks due to diseases and other reasons. According to this scheme, ABFL operates a contributory security fund. Farmers contribute Tk. 1.50 per chick to the fund at the time of purchase. For chick mortality of within a range, a portion of the initial contribution or risk premium is refunded. For example, if chick mortality is less than 3 percent, 4-6 percent, 7-10 percent and 11-15 percent then 80, 40, 20, 10 percent of contribution respectively is refunded to the farmer. If the mortality rate is above 15 per cent, the farmer can claim full insurance compensation. In this case, for birds up to 20 days age, Tk. 20 per bird is paid after deducting 15 percent from the total number of lost birds. For birds beyond 20 days age, Tk. 30 is paid per bird after deducting 15 percent from the total number of lost birds. Because of this measure, farmers feel secured and encouraged to take up this venture.

Most poultry farmers in Bangladesh start business without acquiring proper technical knowledge and management skills. Facilities to train poultry farmers on various aspects of poultry farming and management are inadequate in the country. A major deficiency is in feeding regime and management that heavily affect production efficiency. Most of the independent broiler farm owners reported that they did not have sufficient knowledge about poultry diets. In broiler production, ratio of feed varies for starter, grower and finisher stages and managing these properly is precondition for profit efficiency. ABFL provides initial training in the management of the contract farming package and also provide continuous supervision throughout the growing period.

Profitability Analysis of Vertically Integrated Contract Farming System

Profit is mainly interpreted as the difference between the total expenses involved in producing of mature broiler and the total return from its sales. For profitability analysis, in this paper, main cost items consists of feed, labor, vaccine and medicine, transportation, litter, equipment, housing, land use cost, etc. On the revenue side, return from bird, return from fescues and return from feed bag were considered. However, gross return, net return, rate of return were determined and analyzed in this paper.

An attempt was made to determine per bird profit gain from contract and independent broiler farming system. Independent farmers are those farmers who run their business themselves without any contractual agreement with a third party, bear all production expenses by themselves and enjoy all the risks and benefits as a consequence of their decisions. A contract farmer is defined in this study as one who has contractual agreement with an integrator or a feed mill or a trader for supply or purchase of inputs and/or for supply or sale of outputs at pre-determined prices or at prices negotiated at the time of final transaction.

Results reveal that contract farmers earned more profit than independent farmers (Table 1). In the survey period average price and average bird housed per year of contract farmers were Tk. 71 per kg and 9272.5 birds, respectively whereas the figures were Tk. 78 and 7343 birds, respectively for independent farmers.

Total value of fixed costs per bird was Tk 1.9 while variable cost was Tk 91.0. The total costs per farm for contract farms amounted to Tk 92.9 resulting in a net return of Tk 13.6 per bird. For the independent farmer 99 percent of total cash returns came from the sales of broilers, which amounts to Tk 105.8. Home consumed reported zero by the both sample independent and contract farmers. On a per bird basis, the total fixed cost of the independent farmer was Tk 1.5 while it was Tk 95.1 for variable cost.

However, in the final analysis, the contract farmers appeared to be better off in their net income. Per bird net return of contract farm is more than 1.4 times higher than the net return of independent farm. Rate of return also indicates that contract farm earns higher profit than independent farm.

Vertically Integrated Contract Farming System on Small Farmers Income

This section also explores the potentiality of vertically integrated contract farming system on household income. It is evident that vertically integrated contract farming system is capable of generating higher net return and it is also capable of generating employment opportunity. In examining the role of vertically integrated contract farming system in household income, an arithmetic planning exercise is performed. The idea is to investigate the proportion of family income of small farmers that can be satisfied by a recognized contract poultry farms.

To compare total gross income three types of farms are selected, these are independent, contract and non-poultry farm. Generally, farm households in Bangladesh are distributed into three categories based on land holdings: small, medium and large. A small household has an operational area between 0.05 and 2.49 acres of land. A medium farm household has it between 2.50 and 4.99 acres. A large farm household is one with 5 acres of operational holding or more. Average landholdings of independent, contract and non-poultry farms were 1.18, 1.77 and 1.65 acre, respectively. So, average landholding indicated that all types of farms are under small farms category.

Non-poultry farms are defined as the farmers are not in poultry farming for commercial purposes but they may rear a few scavenging poultry for home consumption and for sale at the local during the necessity of emergency cash.

The average income earned by different types of farms from various sources varied considerably (Table 2). Non-poultry farms earned the lowest gross income among the farm types. About one third of the income of non-poultry farms came from remittances from family members working away from home – either in-country or abroad.

Table 3 shows that average gross income of non-poultry farm was Tk. 107121.3 per year where as independent and contract poultry farm earned Tk. 76653.6 and Tk. 127833.2 per year respectively only from their poultry. Contract poultry farm satisfies 55% share of total income of contract farmers. Thus, if small farms plan to enter in contract poultry farming system, they can obtain substantial income gains.

In this way contract farming system can prove to be a realistic and tangible tool of income gain for small farmers.

Table 1. Comparative annual average cost, return and profit of independent & contract broiler farms (per bird basis)

Particulars	Independent farm (Taka/farm)	%	Contract farm (Taka/farm)	%
Total variable cost				
DOC	32.0	33.1	27.4	29.4
Feed	49.7	51.5	50.9	54.7
Vaccine & medicine	4.7	4.9	3.5	3.8
Trans Cost	0.6	0.7	1.0	1.1
Labor Cost	1.7	1.8	2.1	2.3
Additives	1.2	1.2	0.8	0.9
Others	0.7	0.7	1.0	1.1
Interest on operating capital	4.5	4.7	4.3	4.7
Sub Total	95.1	98.4	91.0	98.0
Total Fixed cost				
Depreciation on equipment	0.1	0.1	0.2	0.2
Depreciation on housing	1.1	1.1	1.0	1.1
Land rent	0.4	0.4	0.8	0.8
Sub Total	1.6	1.6	1.9	2.0
Total Cost	96.7	100.0	92.9	100
Total Cash Returns				
Broiler sold	105.8	99.1	104.4	98.1
Faeces sold	0.3	0.3	0.3	0.3
Feed bag sold	0.7	0.6	0.8	0.7
Insurance	n.a		1.0	0.9
Sub Total	106.7	100	106.5	100
Home consumed				
Total Returns	106.7	100	106.5	100
Gross margin	11.6		15.5	
Net return	10.1		13.6	
Rate of Return	0.1 (0.35)		0.2(0.29)	

Source: Field survey, 2003

Note: 1) Sample size of both independent and contract farms were 20 for each

2) 1US\$ = 68.25 Taka (July, 2007)

3) The figures in parentheses indicate coefficient of variation

4) Gross margin and Net return are calculated by deducting total variable cost and total cost from total return, respectively. Rate of return is calculated by dividing net return to total cost

5) n.a. = not applicable

Table 2. Average annual family gross income of sample farmers and its sources (by farm type)

Item	Contract Farm (20)	Independent Farm (20)	Non-Poultry Farm (20)
Average gross income per farm (Tk.)	110085.0	103880.0	107121.3
Share by source:			
Crop	83930.0	24935.0	51101.3
Services	6600.0	11400.0	13205.0
Others	0.0	4900.0	8305.0
Business	7350.0	38350.0	8510.0
Remittance	6000.0	30500.0	26000.0

Source: Field survey, 2006

Note: Others include income from fishing, livestock etc.

Although ABFL started with 20 farmers in 1994, and the number reached to 650 in 2003, but after bird flu incidence, the number of ABFL's contract farms fell from 650 to 200 in 2004 but subsequently increased to 315 in 2005 (Figure 1). According to figure 1 it means that the people of that locality started taking interest in contract poultry farming by knowing its profitability. The producers

in the contract system attain the highest gross margins as well as net return. Producers clearly favor the vertically integrated contract farming system as it yields higher gross margins and net return.

According to the figure 1 it seems that the contract framer took interested to enter into the contract poultry farming system by knowing its profitability although the farm has changed its contractual agreement.

Table 3. Information of income potentiality of different types of poultry farms

Item	Contract Farm (20)	Independent Farm (20)	Non-Poultry Farm (20)
Average size of land holdings (acre)	1.2	1.8	1.7
Average net income from poultry farming per household per year (Tk.)	76653.6	127833.2	
Total income per household per year without poultry farming (Tk.)	110085.0	103880.0	107121.0
Total income per household per year with poultry farming (Tk.)	186738.6	231713.2	107121.0
VICF satisfies of the total income (%) per year		55.2	

Source: Field Survey, 2006

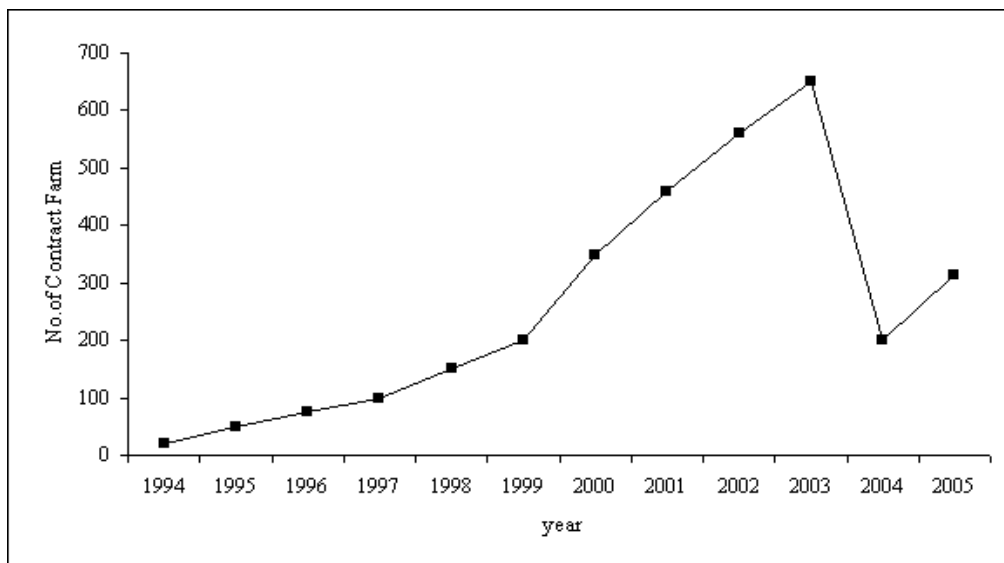


Figure 1. Number of Contract Farms of ABFL from 1994 to 2005

Employment Opportunity from Contract Farming

The employed population in Bangladesh was 58.1 million in 2000, compared with 54.6 million in 1996 and 50.2 million in 1991 (Table 4). Agriculture still provides employment for the vast majority of the population. In 2000, 36.2 million people were working in the sector compared with 32.6 million in 1989 and 33.3 million in 1991. Due to urbanization, the share of agriculture labor in the total employed population has slightly declined from 66.5 percent in 1991 to 62.3 percent in 2000.

In 2000, 26 percent of all employed worker reported to work more than 35 hours per week, 11 percent of workers were classified as wholly unemployed, 35.4 percent as under-employed. In theory, under-employment is the condition whereby a person's employment is considered inadequate in terms of time worked, income earned, productivity or use of skills. But due to some difficulties, LFS (Labor Force Survey) 1991 issue estimated under-employment only on the basis of hours worked. Individuals not working at all or employed as unpaid family helpers and working less than 15 hours in a week are treated as unemployed persons. On the

other hand, those working less than 35 hours per week are considered as under employed.

The existence of significant unemployment and under-employment rate suggests that the country has significant surplus labor and by using those labor forces the country has an opportunity to flourish its economy.

Commercial poultry farming system has also created job opportunities. The poultry sector could generate employment by using family labor as well as hired labor. The survey also collected information on labor use for poultry production activity.

The survey also collected information of the labor use for poultry production activity. Table 5 presents the labor use information for independent and contract poultry farm. The use of family labor in the poultry farming activity in

the contract farm was significantly higher than in independent farms.

Furthermore, the broiler industry generated jobs within the industry, in terms of production (i.e., hatcheries, breeder farms, broiler farms, corn, soybean farms) processing (i.e., feed mills, dressing, processing, cold storage) marketing (including veterinary and extension services) and consumption(e.g. fast-food outlets, restaurants). Jobs were also created at the farm level by using family labor. Moreover, the broiler industry generated jobs within the industry, which represents a positive impact on the country's unemployment problem. From the above discussion it is clear that small farmer can be benefited by entering contracting system both in enhancing net income and employment generation.

Table 4. Status of the labor force in Bangladesh

Particulars	1980/81	1985/86	1988/89	1990/91	1995/96	1999/00
Employed population (million) ¹	25.3	30.5	50.1	50.2	54.6	58.1
Employed population in agricultural sector (million) ¹	-	-	-	33.3	32.6	36.2
Share of agriculture labor in the total employed population (%)	-	-	-	66.5	-	62.3
Wholly unemployment (as % of total labor force) ²	-	-	-	-	-	11
Underemployment (as % of total labor force) ²	-	-	-	-	-	35.4

Source: BBS (1), Asian Development Bank (ADB), 2002 (2)

Table 5. Use of labor in poultry production in independent and contract farming system

Types of Labor	Independent farm (m-day/farm/year)	% of total labor	Contract farm (m-day/farm/year)	% of total labor
Family labor	123.85	32.50	218.6	68.44
Hired labor	257.25	67.50	100.80	31.56
Total labor	381.1	100.0	319.40	100.0

Source: Field Survey, 2006

Notes: 1) Sample size of both independent and contract farms was 20

2) 1 man-day = 8 hours

Conclusion

Commercial poultry farming system in Bangladesh faced so many problems, such as lack of capital, inadequate knowledge of poultry rearing, outbreak of diseases, inadequate availability and high price of inputs (feed, day old chicks and vaccines & medicines), inadequate institutional credit, less profitable markets for their output etc. The results indicated that in contract farming system the advantage to the farmer is that the market for the

product is relatively assured, have access to technical assistance, production inputs, services and production credit. Thus the farmer is able to produce the product and improve productivity and eventually raising farm income. Well-organized contract farming does, however provide such market linkages, and would appear to offer an important way in which small producer also can run farm as a commercial manner.

The results of the study also reveal that contract farmers can earn more annual gross income than any other category of small farm in that area. Thus the contract farming plays a significant role in small farmer development, because, the main feature of the ABFL broiler farming system is that it is some kind of a partnership between ABFL and the contract farmer whereby the contract farmer provides land, housing, equipment and labor and ABFL provides inputs (initially on credit but later on cash), technical knowledge and supervision that reduces yield uncertainty, and assured market for products at pre-agreed prices or pricing mechanism thereby providing reducing price uncertainty, all likely to contribute to a remunerative business. So, it can be concluded that vertically integrated contract poultry farming could be a potential approach to increase small farms income and employment opportunity as well as the poultry production in Bangladesh. By bringing all the poultry producers into a contracting system, the poultry sector of Bangladesh could be expanded which ultimately could boost up the development.

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